Claims

1. A sensor comprising:

a field effect transistor having a source, drain and floating gate, wherein the floating gate has an extended portion; and

a chemoreceptive layer coupled to the extended portion of the floating gate.

2. The sensor of claim 1 and further comprising multiple chemoreceptive layers electrostatically coupled to the extended portion of the floating gate.

3. The sensor of claim 1 wherein the chemoreceptive layer is electrically isolated from the extended portion of the floating gate.

4. The sensor of claim 3 wherein the electrical isolation is provided by a nitride plug.

5. A sensor comprising:

a field effect transistor having a source, drain and floating gate, wherein the floating gate has an extended portion; and

multiple selectively chemoreceptive fingers electrostatically coupled to the extended portion of the floating gate.

6. The sensor of claim 5 wherein the selectively chemoreceptive fingers are electrically isolated from the extended portion of the floating gate.

7. The sensor of claim 6 wherein the electrical isolation is provided by a nitride plug.

8. The sensor of claim 5 and further comprising a microfluidic channel coupled to at least one of the chemoreceptive fingers for selectively exposing such chemoreceptive fingers to fluid.

9. The sensor of claim 8 and further comprising a separate microfluidic channel for each chemoreceptive finger for selectively exposing such chemoreceptive fingers to different fluids.

10. A sensor comprising:

a field effect transistor having a source, drain and floating gate, wherein the floating gate has an extended portion; and

multiple control gates coupled to the extended portion of the floating gate.

11. The sensor of claim 10 wherein some of the control gates comprise chemoreceptive fingers capacitively coupled to the floating gate.

12. The sensor of claim 11 wherein a floating gate voltage is a weighted sum of voltages on the control gates.

13. The sensor of claim 13 wherein the weight on each control gate is directly proportional to the control gate's capacitance, and is normalized by the total capacitance of the floating gate.

14. The sensor of claim 11 wherein the chemoreceptive fingers comprise a conductor and a film having chemoreceptive properties.

15. The sensor of claim 14 wherein the chemoreceptive fingers further comprises a dielectric isolator between the conductor and the chemoreceptive film.

16. A sensor comprising:

a field effect transistor having a source, drain and floating gate, wherein the floating gate has an extended portion;

a chemoreceptive layer capacitively coupled to the extended portion of the floating gate; and

a microfluidic channel coupled to the chemoreceptive layer.

17. The sensor of claim 16 and further comprising one or more resistors coupled to the microfluidic channels.

18. The sensor of claim 17, wherein the resistors provide a reference potential to the microfluidic channels.

19. A sensor comprising:

an array of field effect transistors, each having a source, drain and floating gate, wherein the floating gate has an extended portion with a chemoreceptive layer electrostatically coupled to the extended portion of the floating gate.

20. The sensor of claim 19 and further comprising a controller coupled to the field effect transistors to measure current flowing between the source and drain of each transistor.

21. The sensor of claim 20 and further comprising a transponder coupled to the controller for communicating with other devices.

22. A method of sensing chemicals comprising:

providing a sample to a chemoreceptive layer supported by an extended electrostatically coupled gate;

inducing a voltage on the extended gate; and

modulating current through a source and drain based on the induced voltage on the floating gate.

23. A method of sensing comprising:

providing a sample to multiple selectively receptive fingers;

inducing a voltage on a floating gate capacitively coupled to the fingers; and

modulating current through a source and drain based on the induced voltage on the floating gate.

24. A sensor comprising:

a field effect transistor having a source, drain and floating gate, wherein the floating gate has an extended portion;

a sensing gate supported by the extended portion of the floating gate;

a dielectric layer disposed between the extended portion of the floating gate and the sensing gate; and

a chemoreceptive layer supported by the sensing gate.

25. The sensor of claim 24 and further comprising a microfluidic channel formed proximate the chemoreceptive layer that selectively provides fluid to the chemoreceptive layer.